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COMPETITIVENESS OF MALAYSIAN EXPORTS

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Given the importance of Malaysian manufacturing exports before and after the economic crisis in 1997, the paper seeks to assess the ability of Malaysian manufacturing exports to compete as well the sources of competitiveness. It was found that Malaysian export of high technology products has grown tremendously between 1989-98. However these exports are concentrated in only 2 product groups. The main competitors from within ASEAN countries are Singapore, Philippines and Thailand while outside ASEAN, China is also rapidly catching up in high technology exports. Foreign direct investment was found to be a relatively important source of competitiveness as compared to the exchange rate. Thus, key domestic issues that can affect the future competitiveness of Malaysian exports are the exchange rate policy, FDI policy, export diversification as well as human capital development. On the external front, competitive pressures from China, the future of the Japanese economy as well as the progress of global liberalization will also have important bearings on the ability of Malaysian exports to compete in the future.

Memandangkan pentingnya eksport perkilangan Malaysia sebelum dan selepas kegawatan ekonomi dalam tahun 1997, kajian ini cuba meneliti keupayaan eksport perkilangan negara untuk bersaing dan seterusnya sumber daya saingan eksport tersebut. Hasil kajian ini menunjukkan pertumbuhan eksport barang berteknologi tinggi telah bertambah pesat antara 1989-98. Bagaimanpun, eksport tersebut hanya bertumpu kepada 2 kategori produk. Pesaing dalam ASEAN yang dihadapi oleh eksport Malaysia ialah Singapura, Filipin dan negara Thai manakala dari luar ASEAN ialah negara Cina yang juga mengalami pertumbuhan pesat dalam eksport barang berteknologi tinggi. Pelaburan langsung asing merupakan satu sumber daya saing yang relatif penting berbanding dengan kadar pertukaran asing. Justeru itu, isu domestik yang boleh mempengaruhi daya saing barang perkilangan pada masa depan ialah dasar kadar pertukaran, dasar pelaburan langsung asing, pelbagaian eksport, dan pembangunan modal manusia. Di peringkat luar negara, daya saing dari negara Cina, masa depan ekonomi negara Jepun dan juga perkembangan liberalisasi secara global juga akan menentukan keupayaan eksport Malaysia untuk bersaing pada masa depan.

INTRODUCTION

Malaysia's move toward export-promotion can be traced back to the late sixties with the enactment of the Investment Incentive Act in 1968. This shift was prompted by both the practical reality of a small domestic market, domestic unemployment, as well as the general perception that higher exports are positively related to a higher growth of the Gross Domestic Product (GDP). Although the latter relationship has been questioned, nevertheless this policy stance was pursued for the manufacturing sector from the 1970s right through both the Industrial Master Plans in this country.

In terms of its impact, the rapid growth that has been achieved in this country since the recession in the mid-1980s till the 1997 financial crisis was frequently attributed to this export-push strategy despite the fact that selective protection was conducted in conjunction with this strategy during this period. Moreover the export-push strategy was also implemented together with foreign-direct investment (FDI) promotion as the restriction on equity ownership was often relaxed based on export conditions even before the implementation of the Promotion of Investment Act (PIA) in 1986.[1] Thus it is difficult to differentiate the impact of export-promotion from FDI-promotion.

Nonetheless the outcome of both export and FDI-promotion in the manufacturing sector has led to the transformation of the Malaysian economy from primary production to the production of manufactured goods. This can be clearly seen in the increasing contribution of manufacturing in the GDP, employment and total exports of the country since achieving Independence in 1957. From Table 1, its share in GDP increased significantly from 13.9 per cent in 1970 to a peak of 35.7 per cent in 1997. Subsequently this share decreased slightly to 34.4 per cent in 1998 due to the financial crisis in 1997. Similarly, its contribution to total employment rose from 8.7 per cent to 27.1 per cent in 1997 before declining to 27.0 per cent in 1998 while the recovery of the economy in 1999 is expected to increase its share back to 27.1 per cent for that year. On the other hand, the share of manufacturing exports increased progressively from 11.9 per cent in 1970 to 82.9 per cent in 1998 and increasing further to 85.4 per cent in 1999 with the depreciation of the ringgit as a result of the 1997 crisis. The growing importance of manufacturing exports was further accentuated during the crisis as well as in recovery process due to the weakened domestic demand and its crucial contribution to employment and international reserves. Thus, for the year 2000, this share is expected to increase further to 85.6 per cent.

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[1] For example, Rasiah (1993) documented evidence on fully foreign owned firms in the Free Trade Zones (FTZs) in the 1970s.

At the same time, the institutionalization of trade and investment has led to increasing efforts to liberalize both at the global, regional and national level. As a result, an increasing number of countries are embracing export-promotion in their move toward industrialization and the external environment that is facing Malaysian exporters has inevitably become increasingly competitive. In view of both its domestic importance and the changing external environment, it is therefore timely to assess the ability of Malaysian manufacturing exports to compete.[2] Besides this objective, the paper will also analyze the main factors that have contributed to the competitiveness of Malaysian manufacturing exports as this will have pertinent policy implications in formulating an appropriate export policy for this country.

The paper is divided into 6 main sections. After the introduction, the analytical framework is presented in Section 2. Section 3 will assess the competitiveness of Malaysian manufacturing exports while the sources of competitiveness are discussed in Section 4. In Section 5, key policy issues that can affect future export competitiveness are analyzed. The main findings of this paper will be summarized in the last section.

ANALYTICAL FRAMEWORK

One of the main difficulties encountered in analyzing the whole issue of competitiveness is that there is no agreement on how to define it. In this study, the definition proposed by the Secretariat for the OECD project on "Framework Conditions for Industrial Competitiveness", as cited in Hatzichronoglou (1996) will be used. Competitiveness is thus taken to mean "..... the ability of companies, industries, regions, nations or supranationals to generate, while being and remaining exposed to international competition, relatively high factor income and factor employment on a sustainable basis."

In order to operationalize this definition, competitiveness has to be quantifiable. In this regard, the quantification of competitiveness can take several approaches. First, there is the "engineering" approach whereby the capacity of the firm to compete is essentially based on its ability to adopt or shape the technical and organizational "best practices" in their activities. Second, the "environmental/systemic" approach views competitiveness in terms of optimizing the environment for the firm. Here, the firm's competitive strength is not perceived to be due to internal efficiency. Rather, the competitiveness of

[2] Given the relative importance of manufacturing exports in total exports as shown in Table 1, the scope of the paper will therefore be confined to this sector alone.

a firm is deemed to lie in its ability to harness the firms' environment (such as the incentives of a competitive market, the resources provided by capital and labor markets, the quality of inputs, infrastructure, etc) in order to secure the highest return on capital. Third, in the "capital development" approach, competitiveness depends on the economy's capacity to accumulate technological, human and physical capital. Finally, the "eclectic/academic" approach addresses various aspects of competitiveness in a selective, eclectic and inquiring manner.

Given the focus of this paper lies in analyzing competitiveness at the industry and product level, the last two approach will be used as the first two approaches are more appropriate for firm-level studies while the third approach is more suitable for inter-country studies.

In the eclectic approach, comparative advantage is an indicator that is frequently used to assess export competitiveness. Thus indices on the revealed comparative advantage (RCA) are usually utilized as proxies since it is assumed that the comparative advantage of a country is reflected or revealed in its trade pattern when autarky prices are unknown. Based on UNIDO (1982), the net export to total trade ratio (NX_{ij}) was used to assess the comparative advantage of the different sub-sectors, whereby:

$NX_{ij} = (X_{ij} - M_{ij}) / (X_{ij} + M_{ij})$
where X_{ij} (M_{ij}) : value of country i's export (import) of commodity j

This indicator's value ranges from –1 to +1 with the latter value denoting no imports are associated with exports. However, both export subsidies and import barriers can affect this measure. Unfortunately information on both the extent and magnitude of export subsidies in Malaysia is lacking while the latest study on the effective rate of protection in Malaysian manufacturing by Rokiah (1996) provides data up to 1987 alone. Nevertheless this is still a useful indicator as it indicates the import dependence of exports.

Alternatively, the world export ratio (WES) can also be used whereby:

$WES_{ij} = (X_{ij}/X_i) /(X_{wj}/X_w)$
where X_{ij} : value of country i's export of commodity j,
X_i : value of country i's total exports,
X_{wj} : value of world exports of commodity j,
X_w : value of world exports.

The value for the WES index can be any positive value. For example, a ratio of two indicates that the share of that commodity in a country's exports is twice

the world average. Therefore the larger the value, the greater the comparative advantage and the more competitive for the industry concerned.

THE COMPETITIVENESS OF MALAYSIAN MANUFACTURING EXPORTS

Structure of Malaysian Manufacturing Production, Exports and Imports

In this section, a brief sketch of the Malaysian production, export and import structure is presented as a background for the subsequent discussion. Based on Table 2, it can be observed that the share of the resource-based sub-sector fell progressively from 1986-97, while conversely, the share of the non-resource-based sub-sector increased during the same time period. During the recession in 1998, however, the latter's share fell due to the decrease in the shares of the iron and steel basic industries, the manufacture of machinery as well as transport equipment. Furthermore, the share of the electrical and electronics (e&e) sub-sector increased steadily for the whole period shown in Table 2 and constituted the most important sub-sector for the non-resource-based industries. In the resource-based sub-sector, chemical and other chemicals is the largest sub-sector for the same period.

In terms of their contribution to exports, it can be seen from Table 3 that the largest group of manufacturing exports is found in electronics, electrical machinery and appliances between 1985-99. In 1999, the second largest component in manufacturing exports is the chemical and chemical products sub-group while textiles, clothing and footwear occupies the third position. As for imports, investment goods and intermediate goods constitute the largest import category between 1985-98.[3]

As explained in Tham (2000), tthe dominance of foreign direct investment (FDI) in the e&e sub-sector has led to a pronounced concentration of both value-added and exports in the same sub-sector. In turn the evolution of production networks in the region as well as limited domestic capacity to meet with the input demands of the multinationals has led to a high import content in the manufacturing sector.

[3] The classification of gross imports has changed since 1998 and hence data according to economic function post-1998 is not available.

Competitiveness of Malaysian Manufacturing Exports

Das (1998) studied the changing comparative advantage and the changing composition of the exports for several Asian economies in relationship with the economic transformation in these countries, especially within the manufacturing sector. As these countries moved up the industrialization ladder, structural change was observed within their manufacturing sectors. This was in turn manifested in changes in the comparative advantage of their manufacturing exports. For example, Das found between 1980-93, Malaysia experienced a decline in the revealed comparative advantage index values (RCA)[4] for mineral intensive and agricultural intensive exports (Table 5). This pattern was also observed for all the ASEAN-5 countries with the exception of Indonesia that experienced a converse improvement in the RCA of these exports as well as Singapore that also experienced an increase in the RCA of the mineral-intensive exports.[5] On the other hand, all 5 countries witnessed an improvement in their RCA index values for technology-intensive, human capital intensive and capital intensive exports. Similarly, all with the exception of Singapore also saw an improvement in the RCA index values for labor-intensive exports.

Das's analysis further reveals that Malaysia together with other ASEAN countries is moving toward technology intensive export lines. In particular by 1996, Das noted electronics exports such as PCs, semiconductors, color televisions, VCRs, office-automation machines, and other electronics (from SITC 74, 75 and 76) became the most important exports for Singapore, Korea, Malaysia, China and Taiwan, in that order.

Subsequent study by Sunil (2000) gave additional supporting evidence on the increasing importance of high technology exports for Philippines, Thailand, Malaysia, and Singapore. Based on Hatzichronoglou (1997)'s list of high technology products, Sunil's RCA indices of high technology exports show a strong improvement in the competitiveness of Philippines, Thailand, and Singapore in these exports from 1988-98 (Table 6). Although Malaysia's RCA index for these products fell from 2.53 to 2.02 between 1988-89, it rose again steadily in the subsequent years. The same Table also shows that in 1992, Singapore's RCA of high technology products ranked the highest followed by Malaysia, Philippines, and Thailand. However by 1996, Philippines RCA index overtook Singapore and Malaysia and Malaysia continued to remain in the third

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[4] RCA is defined as the world export ratio (WES) as explained in Section 2 of this paper.

[5] ASEAN-5 comprises Indonesia, Malaysia, Philippines, Thailand, and Singapore.

position in 1997. It should be noted that Indonesia is not in the list shown in Table 6.

It is also interesting to note that although the RCA indices for developing and developed countries were approximately the same between 1988-93. But the RCA index for developing countries became progressively larger from 1994-98 while the same index for developed countries fell slightly from 0.98 in 1994 to 0.96 in 1998 (Table 6). Besides gaining in competitiveness, the share of developing countries to developed countries in high technology exports has also increased from a mere 0.09 in 1988 to a high of 0.30 in 1996 before declining to 0.27 in 1998. However the catching up of developing countries is concentrated in specific products within the high technology list. Further disaggregation by the nine product groups in the high technology list as shown in the following section will reveal the product concentration in the high technology exports of the ASEAN-5 countries.

Competitiveness of High-Technology Exports

Based on Tables 7 – 10, several key features of the high technology exports from the ASEAN-5 countries can be detected.

First, using the same index, that is world export share (WES), all 5 countries' high technology products are mainly concentrated in computers-office machines and electronics-telecommunications products. Second, the share of these products in total manufacturing exports are more than 50 per cent in 1998 for Malaysia, Singapore, and Philippines while their share in Thailand and Indonesia are 30 per cent in 1997 and 9 per cent in 1998, respectively.

Malaysia's comparative advantage in the computers-office machines category has grown noticeably from 1.93 in 1994 to 3.24 in 1998 while its relatively greater comparative advantage in the electronics-telecommunications group of products has remained more or less the same for the same period. However, the share of the latter group of products in total manufacturing exports is larger at 32 per cent in 1998.

Similarly, Philippines also indicates greater comparative advantage and a larger export share in the electronics-telecommunications category as compared to the computers-office-machines group of products. It should be noted that Philippines registered tremendous change in her competitiveness and export share in both these product groups for the period shown. For example, the WES index for electronics and telecommunications grew from 2.09 in 1994 to 7.34 in 1998 while its share in total manufacturing exports doubled from 27 per cent to 54 per cent over that period.

In contrast, both Singapore and Thailand exhibit greater competitiveness and a larger export share for computers and office machines compared to electronics and telecommunications for the same period of time.

The net trade ratios reveal a higher import content for the electronics-telecommunications category of products for Malaysia and Singapore as it is close to zero between 1994-98. On the other hand, net trade ratio for computers-office machines is positive for both countries implying greater domestic sourcing in this group of products. Philippines' net trade ratio is not only positive for both group of products but also improved considerably over the same time period as it was negative and zero respectively for the computers-office machine and the electronics-telecommunications group of products in 1994. Thailand's net trade ratio is also positive for computers-office machines but negative for the electronics-telecommunications group of products.

SOURCES OF COMPETITIVENESS

Two main factors that have been used in the literature to explain the competitiveness of manufacturing exports are the exchange rates (REER) and foreign direct investment (FDI).

Exchange Rates

An early study by Gan (1988) found changes in the exchange rate to be an important determinant of Malaysian manufacturing exports between 1975-87. However subsequently, Tan (1995) found no relationship between real exchange rate movements and real exports between 1974 - 92.

More recent studies have also found insignificant relationship between the exchange rate and exports. For example, Ito (2000)'s study on the determinants of real exports for Korea, Taiwan, Hong Kong and the ASEAN-5 countries between 1971-96 found that neither the exchange rate nor the yen had any significant impact on exports. In contrast, growth of the ASEAN-4 is an important determinant: a 1 percentage point increase in the average ASEAN-4 growth rate (excluding the country's own) accelerated export growth by 3 percentage points in Malaysia. Similarly, Parker and Lee (2000) also did not any discernable impact of exchange rates on export competitiveness from 1990 - 96 for the East Asian-9 countries. FDI however was shown to affect significantly export competitiveness.

However, the pegging of the ringgit to the US Dollar since September 1998 has led to its under-valuation relative to other currencies in the region. This has

undoubtedly given a boost to both export and import-competing industries in the country.

Foreign Direct Investment

All the ASEAN-5 countries industrialized with the help of FDI. After the recession of the mid-eighties, FDI inflows surged into the ASEAN economies at an unprecedented scale due to emergence of favorable external and internal factors at the same time. Externally, the significant rise in the value of the yen and other East Asian currencies after the Plaza Accord in 1985 triggered an outflow of Japanese investment in search of lower production costs. This outflow was followed by an outflow of investment from other East Asian economies in an effort to match the competitiveness of Japanese production abroad. Concurrently, the ASEAN economies shifted toward investment and trade liberalization as part of their response to the recession that was experienced then. Consequently in 1993, Malaysia, Singapore, Indonesia, and Thailand were listed among the 10 largest host economies for both FDI flows and stocks.

More importantly, export-oriented FDI in the electrical and electronics sub-sector of Malaysia, Singapore and Thailand influenced significantly the trade pattern between these countries. This is reflected in the increase in intra-ASEAN exports as a share of the bloc's total exports over time. In 1980, this share was only 14 per cent as the major trading partners of ASEAN members were the developed economies (Noordin, 2000). However, this share increased to almost 23 per cent just before the crisis in 1996 but declined to 20.6 per cent in 1998 (Tham, 2000).

Table 11 shows the increasing importance of investment from Japan and the Newly Industrializing Economies (NIEs) of Hong Kong, South Korea, and Taiwan over the period 1986-96, particularly in the first sub-period of 1986-90 for Malaysia and the other ASEAN countries shown in the Table. In the second half of the period, some NIEs investment was diverted to China. Based on Takeuchi (1999b), intra-regional trade among the ASEAN-5 followed the investment pattern as ASEAN-5's exports grew most with Hong Kong, South Korea, and Taiwan over the period 1986-90. But over the period 1990-96, exports with China grew at an average of 24.3 per cent while the growth of exports to NIEs fell from 26.0 per cent to 19.9 per cent over these two sub-periods. Imports grew most with the NIEs in the first sub-period while it grew most intra-regionally in the second sub-period. Exports to Japan fell from 21.5 per cent of total exports in 1986 to 14.2 per cent in 1996. Similarly exports to the United States decreased from 21.2 per cent to 18.5 per cent for the same period.

It is also interesting to note during both sub-periods, Singapore accounted for more than 40 per cent of the expansion in intra-regional trade while more than half of the intra-regional trade in imports can also be attributed to Singapore. Takeuchi therefore concluded that the expansion in intra-regional trade between 1986-96 was primarily driven by an increase in interdependence on the Malay Peninsula, with Singapore as the core of this trade.

Furthermore, in 1995, Takeuchi found that trade in machinery and electrical equipment accounted for more than half of the region's intra-regional exports, followed by mineral fuels, basic metals and metal products. In fact intra-industry trade in information equipment and parts and in electronic tubes such as semiconductors and cathode tubes were the main export products between Singapore and Malaysia, Singapore and Thailand and Malaysia and Thailand. Thus it would appear that the concentration of FDI in the machinery and chemical sub-sectors of these countries has led to the increase in intra-industry and intra-firm trade and consequently an increase in intra-regional trade has followed suit.

The above-mentioned trade pattern can be attributed to the development of regional production networks by the multinationals (MNCs) operating in the region. As the locational choice of the MNCs are determined by the locational advantages of the host economies, the type of FDI that flows into a country reflects the competitiveness of the country for that particular stage of production in the manufacturing process. For example, the Japanese MNC, Sony, chose Singapore to be the regional operational headquarters (OHQ) to oversees Sony's factories in the region (Shojiro, 1992) due to the human resource and infrastructural advantages of Singapore over the other ASEAN countries. Assembly-type operations are then conducted in low-wage countries in the ASEAN region.

Thus Singapore's relatively larger comparative advantage in high technology exports as explained in Section 3.3 can be traced to the better science and technology (S&T) indicators that can found in there compared with the other ASEAN-5 countries. As shown in Table 12, Singapore's S&T indicators are closer to South Korea's than the other ASEAN countries. Philippines can be seen to compete closely with Malaysia in these indicators and unlike Malaysia, Singapore and Indonesia, inflows of FDI into this country increased from 1997 to 1998 (Table 13). This in turn explains the rapid catching up of Philippines in the export of high technology products as shown in Table 9. On the other hand, the increase in inflow of FDI for Thailand in 1998 is due more to the mergers and acquisitions as a result of the financial crisis.

KEY POLICY ISSUES

Domestic Issues

Exchange Rate Policy

A sustainable exchange rate policy is of paramount importance as the ringgit peg cannot be sustained indefinitely since any significant depreciation of other regional currencies may cause the ringgit to be overvalued, thereby impinging on its export performance (Mahani, 2000).

If on the other hand, foreign investors or analysts should consider the ringgit undervalued relative to other regional currencies, then re-pegging it at a higher level (or appreciation) may attract short-term inflows. But this together with the excess liquidity arising from the trade surplus may eventually lead to inflationary pressures as well pressures to further appreciate the ringgit. Therefore the government needs to replace the peg with a sustainable exchange rate policy.

FDI Policy

Post-crisis, there is a need to foster a continuous growth in FDI in order to enable the country to move up the technology ladder and to improve its competitive advantages in manufacturing. Here, establishing consistent and viable rules to govern short-term flows will reassure the international investment community that there will be no sudden and frequent changes in policy directions and this will improve the economic standing of Malaysia as a host economy. While Malaysia has done well in attracting FDI in the past, the continued need to attract more FDI in the face of increasing competition for FDI will require the country to shift directions in its FDI policies so as to encourage MNCs to reorganize their international production networks to Malaysia's advantage.

This will entail the scope of a suitable FDI policy to encompass more than a mere tax and incentive package alone. Instead, the building up of a suitable environment for MNCs will require policies that are directed at improving the underlying supply-side structure of a host economy. Accordingly, policies required can range from building up and sustaining a comprehensive and modern infrastructure to facilitating the availability of highly skilled labour with the appropriate skills and training. Moreover, the specific features of such policies will require Malaysia to compare its current technological capabilities with other developing host economies so as to be able to attract the type of

MNC that will promote the gradual development of national comparative advantage in the preferred fields of specialisation.

Export Diversification

Malaysia's export product concentration has been well-noted by both policy-makers and researchers. Table 14 shows Malaysia has also strong comparative advantage for wood-based products such as wood and cork products and furniture and fixtures as well as in food products. Moreover these products exhibit lower import demand as the net trade ratio is positive. Another resource-based product that exhibited an improvement in the comparative advantage is the rubber-products sub-sector. Plastic products, non-metal products and fabricated metal products also indicate increasing competitiveness over the period shown. Thus the export policy of Malaysia must encourage the development of these other viable export industries.

Moreover, the resource-based sector also has the advantage of established research institutions in the country that can provide research support for the further development of these sectors. For example, although the Rubber Research Institute (RRI) was initially set up for research on producing natural rubber, its functions were later expanded to cover consumption and end-use aspects. Thus RRI provided invaluable support for manufacturers in the rubber-products sub-sector (Tham and Mahani, 1999).

Human Capital Development

Malaysian exports have competed in the past on the basis of low wages and it is also common knowledge that increasing wages due to labor shortages and mismatches before the crisis has eroded Malaysia's advantage in this area. Although the crisis has reduced the upward pressure on wages, comparative advantage based on low wages is fast becoming irrelevant in view of the implications of the global high technology revolution on the international division of labor.

First, according to Lee (1996), the new high technology revolution is biased toward *intangible* (human and knowledge) capital using rather than *physical* capital using. This bias implies a greater need for educational attainment of the labor force as the principal inputs in high technology industries are highly educated scientific and engineering staff and skilled technicians. Second, with high technology labor will become a very small component of the total cost of production and hence even the manufacture of steel, heavy equipment, machines and textiles may become viable and competitive again in industrial countries. Third, with rapid technological change, what is demanded of a

worker is no longer qualification or skill but competence. In other words, it is no longer the ability to handle a certain task that counts but the ability to handle uncertainty and to solve problems. Lee points out that at higher levels of the occupational ladder, this would require general communication skills and problem-solving abilities.

Thus improving export competitiveness requires a complementary policy in human capital development that emphasizes not only the attainment of science and engineering but also the development of communication and problem-solving skills.

External Issues

Competition from China

China's large domestic market has attracted considerable FDI in the 1990s. The fall in NIE-3 investment in ASEAN in the first half of the nineties (Table 11) can be attributed to the shift in their investment to China due to the similarity of culture and the ease of a common language. The competitive pressures have also been compounded by the similarity industries targeted for development with the help of FDI. As shown in Table 15, the machinery and transport equipment sub-sector is the largest sub-sector for China, Malaysia and Singapore in 1997.

Table 16 shows the improvement in China's WES index for the computers-office machines sub-sector from 0.44 in 1994 to 1.23 in 1998. The import content has also declined as the NTR has increased from 0.11 to 0.34 over the same period. Similarly the WES index for the electronics-telecommunications sub-sector has also increased for the same duration, albeit a little more slowly compared with the computers-office machines sub-sector. Thus China is also catching up in the race to export high-technology products.

Furthermore, it should be noted that China's comparative advantage in high-technology products is not confined to these 2 sub-sectors alone. The same Table reveals China's higher WES index in 1998, compared to Malaysia (Table 7), for all the other sub-sectors shown with the exception of the aerospace and non-electrical machinery sub-sector. Thus, should China succeed in developing a highly integrated production structure domestically, then the scope for complementary relationships between ASEAN and China will be reduced (Takeuchi, 1999a).

Moreover, China's impending membership in the World Trade Organization (WTO) will heighten the competitive pressures from this country as it will then

fully liberalize its trading system after a three-year transitional period. By then it is anticipated that any companies, whether domestic or foreign, will be able to trade in goods freely. Investment diversion to China is also expected to increase due to expansion of approved areas of investment.

Future of the Japanese Economy

The restructuring of Japanese companies in the face of the difficulties in the financial sector may take some time to complete. If so, then the prospects for an improvement in outward FDI may be quite dim. According to UNCTAD (1999), only slightly more than a quarter of the Japanese manufacturing MNCs have projected increased investment abroad for the period 1999-2001 as compared with 40 per cent in 1997. Moreover, it is also anticipated that FDI outflows will be led by mergers and acquisitions rather than greenfield investment. Given the importance of Japanese investment in Malaysia (see Table 11), a sustainable recovery in Japan will also help to sustain Malaysia's recovery from the crisis.

Besides according to Mukoyama, et al., (2000), Japanese companies need to switch from a regional perspective to a global perspective in their strategies. Hence their Asian business activities and base functions must be re-positioned to a global perspective. This may entail a restructuring of their business activities abroad and the Asian preference may change.

Progress in Global Liberalization

The Seattle debacle indicates the general dissatisfaction of developing countries over the process of liberalization. Developed countries have also blocked the inclusion of a multilateral agreement on investment (MAI). However, as it stands, the Uruguay Round (UR) Agreement which came into force in 1995 must be accepted as an irreducible package by all signatories such as Malaysia. Good practices in export policy under WTO rules disallow the use of export subsidies and the local content requirements. Nor does it favor elaborate export-process zones as the preferred treatment of export industries creates distortions against other sectors of the economy (Laird, 1997). Naqvi (1996) further notes that the UR Agreement does not necessarily imply developing countries' access to developed countries markets will automatically improve dramatically. For example, in the case of textiles and clothing, even as non-tariff barriers are being lowered, the new "bound" tariff rates, are in some cases, higher than the prevailing rates. Moreover, the UR Agreement does not exclude the use of anti-dumping (AD) by developed countries to prevent the lower-priced exports from developing countries from entering their markets on grounds of predatory pricing.

With WTO, inter-sectoral neutrality in policy-making is favored, together with the removal of anti-export bias of other trade policies. Other strategies suggested by Laird (1997) for improving export competitiveness include improving export procedures, increasing domestic competition and maintaining stable realistic real effective exchange rate. Thus industrial policies such as the selective promotion of certain sectors are discouraged and countries are encouraged to export according to their existing comparative advantages. This implies that developing countries will have to compete with developed countries on the basis of economic foundations alone and will need greater country investment in human capital formation, infrastructural and technological capabilities in order to catch up with the industrialized world.

CONCLUSION

Malaysia's export and FDI-promotion policies has facilitated the industrialization process in the country. Consequently, manufacturing exports became increasingly important, especially after the recession in the mid-eighties. Previous studies indicate increasing comparative advantage for human capital intensive, capital intensive and technology-intensive products for Malaysia. In the case of the last product category, Malaysia has emerged as one of 5 developing countries that are making important contributions to world exports of high technology products.

Further disaggregation for the period 1994-98 reveals Malaysia's comparative advantage in high technology exports is concentrated in two product groups, that is computers-office machines and electronics and telecommunications. Singapore is seen to have the largest comparative advantage in the export of computers-office machines in 1998 while Philippines emerged to have the largest comparative advantage in electronics-telecommunications in the same year. More importantly, more than 50 per cent of manufacturing exports are concentrated in these two product groups for Malaysia, Philippines and Singapore in 1998. The net trade ratio shows the import content of the electronics and telecommunications product group to be higher than that of the computers-office machines group for the case of Malaysia.

In terms of the sources of competitiveness, recent studies prove that the role of the exchange rate in determining the export volume to be relatively unimportant while FDI seems to be a more important contributory factor. In assessing the inflows of FDI into the region, it was found that the region's trade pattern followed closely the investment pattern. The locational decisions of MNCs are determined by the locational advantages of the host economies for hosting a particular stage of production in that country. Thus Singapore's human and

infrastructural advantage has led to the MNCs' decision to locate regional OHQ in that country while the labor-intensive segments of the production process are in turn located in countries with a low wage advantage. The choice of the MNCs therefore reflects the competitiveness of a particular country for the production process that is located there.

Key domestic issues that can affect the future competitiveness of Malaysian exports are the exchange rate policy, FDI policy, export diversification as well as human capital development. On the external front, competitive pressures from China, the future of the Japanese economy as well as the progress of global liberalization will also have important bearings on the ability of Malaysian exports to compete in the future.

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Table 1. Manufacturing's Share of Gross Domestic Product (GDP), Employment, and Exports, 1970-99

Year	Manufacturing value added as % of total GDP*	Manufacturing employment (`000)	Manufacturing employment as % of total employment	Manufacturing exports as % of total exports
1970	13.9	290	8.7	11.9
1975	17.4	398	10.1	21.9
1980	19.6	802	15.8	22.4
1985	19.1	836	15.1	32.8
1990	27.0	1290	19.5	62.8
1995	33.1 (27.1)**	2027	25.7	79.6
1996	34.2 (29.1)**	2230	26.4	80.5
1997	35.7 (29.9)**	2375	27.1	81.0
1998	34.4 (27.9)**	2277	27.0	82.9
1999	(29.9)**	2379	27.2	84.9
2000[e]	(31.6)**	2455.0***	27.5***	85.6[e]
2001[f]	(34.1)**	n.a	n.a	n.a

Notes: - In 1978 constant prices
** : In 1987 constant prices for numbers in parenthesis
*** : January-June, 2000
e: estimate
f: forecast

Sources: 1970-1995 extracted from Tham (1998);
1996-1999 - extracted from Mid-Term Review of Seventh Malaysia Plan and Economic Report 1999/2000; 2000/2001 - extracted from Economic Report, 2000/2001.

Table 2. Value-added share of Manufacturing Industries, 1986-1998 percentage)

Industry	Value Added (RM million in 1978 prices)					
	1986	1990	1995	1996	1997	1998
Resource-Based	59.2	58.5	48.2	48.7	48.0	50.7
Food Manufacturing	}	12.7	8.5	8.1	7.8	8.5
Beverages Industries	} 22.6	7.5	1.2	1.3	1.1	1.1
Tobacco Manufacturing	}	2.3	1.1	1.1	1.1	1.2
Wood & Wood Products	10.8	6.1	5.5	5.6	4.9	4.9
Chemical & Other Chemicals	6.6	16.4	14.2	14.5	15.6	16.8
- Industrial Chemicals	n.a	10.7	8.7	9.0	9.4	10.2
- Other Chemical Products	n.a	3.3	3.2	3.2	3.1	3.0
- Plastic Products	2.2	2.3	2.3	2.3	3.1	3.6
Petroleum Refineries	3.5	1.9	1.5	1.5	1.5	1.5
Rubber Products	7.5	8.4	8.0	7.9	7.4	8.9
Non-Metallic Mineral Products	6.0	7.8	7.3	8.1	7.9	7.0
- Glass & Glass Products	n.a	1.0	0.8	0.8	0.7	0.6
- Non-Metallic Products	n.a	6.8	6.5	7.3	7.2	6.4
Non-Ferrous Metal	n.a	0.8	0.7	0.7	0.8	0.8
Non-Resource-Based	40.8	41.5	51.8	51.3	52.0	49.3
Textiles & Clothing	7.0	6.8	6.4	5.8	5.5	5.8
- Manufacturing of Textiles	n.a	4.0	4.4	4.0	3.9	4.0
- Wearing Apparel	n.a	2.8	2.0	1.8	1.6	1.8
Iron & Steel Basic Industries	3.8	3.1	3.5	3.6	3.6	2.6
Fabricated Metal Products	3.0	2.9	7.2	7.9	7.9	7.3
Electrical & Electronic Products	19.9	23.7	30.1	29.1	29.9	30.8
- Manufacture of Machinery	2.3	1.6	2.7	2.3	2.1	1.5
- Electrical Machinery	17.6	22.1	27.4	26.8	27.8	29.2
Transport Equipment	3.1	5.0	4.2	4.6	4.7	2.5
Others	4.0	0.0	0.4	0.4	0.3	0.4
Total	100.0	100.0	100.0	100.0	100.0	100.0

Note: n.a : not available
Sources: 1986: Anuwar Ali (1992) 1990: Malaysia, 1996 1995-1998: Malaysia, 1999

Table 3. Gross Exports of Manufactured Goods, 1985-1999

	1985		1990		1995		1996		1997		1998		1999	
	RM million	% share	RM million	% share	RM million	% share	RM million	% share	RM million	% share	RM million	% share	RM million	% share
Electronics, electrical machinery and appliances	6492.9	52.1	26502.4	56.6	96747.8	65.7	104278.9	65.8	119050.0	66.5	161733.0	68.1	195047.0	60.7
Electronics	4893.6	39.2	15355.4	32.8	56780.2	38.5	64629.7	40.7	80807.4	45.1	114175.0	48.0	144885.0	45.1
• Semiconductor	4439.2	35.6	11685.2	25	33197.0	22.5	35241.8	22.2	40820.4	22.8	54483.0	22.9	65485.0	20.4
• Electronic equipment & parts	454.4	3.6	3670.2	7.8	23583.2	16	29387.9	18.5	39987.0	22.3	59692.0	25.1	79400.0	24.7
• Electrical machinery & appliances	1599.3	12.8	11147	23.8	39967.6	27.2	39649.2	25.0	38242.6	21.3	47558.0	20.0	50162.0	15.7
• Consumer electrical products	581.0	4.7	5531.4	11.8	21352.9	14.6	19938.8	12.6	17765.6	9.9	20648.0	8.7	21728.0	6.8
• Industrial & commercial electrical products	356.1	2.9	3341.6	7.1	10059.2	6.8	10485.0	6.6	11972.0	6.7	15065.0	6.3	16498.0	5.2
• Electrical industrial machinery and equipment	608.4	4.9	2143.6	4.6	7977.8	5.4	8567.9	5.4	7773.2	4.3	10974.0	4.6	11107.0	3.5
• Household electrical appliances	53.8	0.4	130.4	0.3	577.7	0.4	657.5	0.4	731.8	0.4	871.0	0.4	829.0	0.3
Textiles, clothing and footwear	1288.7	10.3	3907.2	8.3	6518.5	4.4	6963.1	4.4	7615.7	4.3	9442.0	4.0	9467.0	3.0
Chemicals & chemical products	610.2	4.9	1468.1	3.1	6256.5	4.3	6737.0	4.3	8211.6	4.6	10627.0	4.5	11105.0	3.5
Wood products	365.1	2.9	1347.2	2.9	4953.7	3.4	6089.0	3.8	6491.6	3.6	5982.0	2.5	6984.0	2.2
Manufactures of metal	356.6	2.9	1576.9	3.4	4655.6	3.2	5003.1	3.2	5663.2	3.2	8255.0	3.5	7862.0	2.5
Transport equipment	566.2	4.5	1928.0	4.1	5251.8	3.6	4543.9	2.9	4904.1	2.7	8064.0	3.4	5114.0	1.6
Rubber products	113.1	0.9	1353.8	2.9	3267.8	2.2	3586.3	2.3	3959.2	2.2	5739.0	2.4	5061.0	1.6
Optical and scientific equipment	226.4	1.8	1061.0	2.3	2898.0	2.0	3131.8	2.0	3917.0	2.2	4760.0	2.0	4834.0	1.5

Source: Central Bank, Annual Report. Various years

Table 4. Gross Import by Economic Function, 1985-1998

	1985		1990		1995		1996		1997		1998	
	RM million	%	RM million	%	RM million	%	RM million	%	RM million	%	RM million	%
Consumption goods	6177.3	20.3	13014.9	16.5	27622.5	14.2	28089	14.2	31699.6	14.3	31105	13.6
Food	1833.8	6.0	2794.5	3.5	4879.6	2.5	5610	2.8	6307.4	2.9	6665	2.9
Consumer durables	1091.7	3.6	2650.4	3.4	5743.4	3.0	5100.2	2.6	5963.9	2.7	4975	2.2
Others	3251.8	10.7	7570	9.6	16999.5	8.8	17378.8	8.8	19428.3	8.8	19465	8.5
Investment goods	9481.1	31.1	29658.2	37.5	78776.4	40.5	78906.9	40.0	93566.7	42.3	87349	38.3
Machinery	3291.3	10.8	8828	11.2	21690.5	11.2	21622.1	11.0	23995.5	10.9	17848	7.8
Transport equipment	1313.5	4.3	5775.9	7.3	11298	5.8	9440.7	4.8	13023	5.9	13289	5.8
Metal product	1721.1	537	4994.2	6.3	11726.7	6.0	11668.7	5.9	13708.4	6.2	10555	4.6
Others	3155.2	10.4	10060.1	12.7	34061.2	17.5	36175.4	18.3	42839.8	19.4	45658	20.0
Intermediate goods	14518.8	47.7	35904	45.4	86916.6	44.7	89163.8	45.2	94303.4	42.7	108285	47.4
For manufacturing	9332.3	30.7	28379.5	35.9	75108.4	38.7	75451.2	38.3	79210.3	35.8	93098	40.8
For construction	905.5	3.0	2147.1	2.7	4425.8	2.3	5404.2	2.7	5259.3	2.4	4599	2.0
For agricultural	722.5	2.4	1095	1.4	1703.9	0.9	2003	1.0	2288.8	1.0	2468	1.1
Crude petroleum	1125.6	3.7	432.3	0.6	377.7	0.2	465.3	0.2	473.8	0.2	680	0.3
Others	2382.9	7.8	3850.1	4.9	5300.8	2.7	5840.1	3.0	7071.2	3.2	7439	3.3
Imports for re-export	260.6	0.9	541.4	0.7	1029	0.5	1120.1	0.6	1414	0.6	1571	0.7
TOTAL	30437.8	100	79118.6	100	194344.5	100	197279.8	100	220983.8	100	228309	100

Source: Tham, 1999b

Table 5. Revealed Comparative Advantage Indexes for the Asian Economies

	Mineral Intensive		Agricultural Intensive		Technology Intensive		Labor Intensive		Human Capital Intensive		Capital Intensive	
	1980	1993	1980	1993	1980	1993	1980	1993	1980	1993	1980	1993
NIEs												
Hong Kong, China	0.06	0.19	0.14	0.24	0.44	0.85	6.69	3.28	1.37	0.75	0.86	0.81
Korea	0.11	0.29	0.75	0.41	0.62	0.93	4.96	2.18	1.44	1.20	0.99	1.04
Singapore	0.94	1.13	1.30	0.53	0.81	1.49	11.43	0.99	0.65	0.68	0.87	1.20
Taipei, China	0.08	0.13	0.95	0.60	0.74	1.25	5.24	2.05	1.05	0.74	0.88	1.04
China, People's Rep. of	0.53	0.43	0.81	0.72	0.39	0.45	4.96	4.06	0.83	0.55	0.59	0.49
ASEAN												
Indonesia	2.52	2.63	1.46	2.27	0.01	0.14	0.11	1.47	0.01	0.32	0.02	0.22
Malaysia	1.16	0.89	3.14	1.58	0.15	0.75	1.08	1.45	0.11	0.82	0.32	0.97
Philippines	0.74	0.55	2.97	1.42	0.10	0.39	2.26	2.94	0.12	0.19	0.13	0.40
Thailand	0.55	0.38	3.91	2.12	0.05	0.62	1.36	1.71	0.18	0.62	0.23	0.67
ASEAN Average	1.81	1.30	2.23	1.87	0.09	0.52	0.58	1.51	0.07	0.58	0.13	0.63
NIEs Average	0.32	0.47	0.84	0.48	0.74	1.20	4.26	1.77	1.10	0.86	0.90	1.06

Source: Das, 1998

Table 6. RCA Indices of Leading High Tech Exporters from the Developing World

	Developed countries	Developing countries	China	Mexico	Korea	Philippines	Thailand	Malaysia	Singapore
1988	1.00	1.06	-	-	0.99	-	1.02	2.53	-
1989	1.00	0.98	-	0.53	0.94	-	1.00	2.02	1.96
1990	1.00	1.01	-	0.44	0.95	-	1.10	2.01	2.10
1991	0.99	1.06	-	0.46	1.04	1.74	1.12	2.05	2.15
1992	1.01	0.95	0.36	0.62	1.09	1.52	1.22	2.15	2.47
1993	1.01	0.97	0.38	0.62	1.08	1.61	1.10	2.18	2.46
1994	0.98	1.09	0.43	0.72	1.17	1.63	1.22	2.28	2.61
1995	0.96	1.16	0.52	0.76	1.30	1.75	1.22	2.30	2.70
1996	0.95	1.21	0.61	0.77	1.17	2.85	1.42	2.17	2.72
1997	0.95	1.19	0.61	0.82	1.24	2.47	1.44	2.29	2.66
1998	0.96	1.21	0.69	0.87	1.22	-	-	2.48	2.66

Source: Sunil, 2000

Table 7. Comparative Advantage in High-Technology Goods for Malaysia

High-Technology Goods	1994			1995			1996			1997			1998		
	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS
1. Aerospace	-0.15	1.50	0.03	-0.35	1.16	0.02	-0.22	0.71	0.01	-0.45	0.45	0.01	-0.26	0.58	0.02
2. Computers-office machines	0.47	1.93	0.11	0.45	2.14	0.12	0.33	2.04	0.12	0.39	2.58	0.16	0.57	3.24	0.19
3. Electronics-telecommunications	0.02	3.81	0.28	-0.01	3.74	0.30	0.01	3.81	0.30	0.02	3.71	0.30	0.03	3.82	0.32
4. Pharmacy	-0.70	0.03	0.00	-0.65	0.04	0.00	-0.69	0.03	0.00	-0.64	0.04	0.00	-0.51	0.04	0.00
5. Scientific instruments	-0.12	0.53	0.01	-0.16	0.54	0.01	-0.09	0.53	0.01	0.00	0.62	0.01	0.07	0.54	0.01
6. Electrical machinery	-0.38	0.75	0.00	-0.20	0.83	0.00	-0.33	0.58	0.00	-0.31	0.49	0.00	-0.18	0.66	0.00
7. Chemistry	-0.71	0.13	0.00	-0.34	0.28	0.00	-0.32	0.29	0.00	-0.44	0.33	0.00	-0.12	0.46	0.00
8. Non-electrical machinery	-0.94	0.09	0.00	-0.92	0.08	0.00	-0.87	0.09	0.00	-0.74	0.09	0.00	-0.63	0.11	0.00
9. Armament	-0.46	0.07	0.00	-0.51	0.05	0.00	-0.57	0.03	0.00	-0.89	0.01	0.00	-0.83	0.01	0.00

Notes:
NTR: Net Trade Ratio, $NX_{ij} = (X_{ij} - M_{ij})/(X_{ij} + M_{ij})$
WES: World Export Share, $WES_{ij} = (X_{ij}/X_i)/(X_{wj}/X_w)$
HTS: Share of Export of High Technology Products as the Percentage of Manufacturing Goods, $HTS_{ij} = (X_{ij}/X_{im})$
For categories Electrical Machinery, SITC code for 77844 is not available in all ASEAN-5 countries.
Source: Computed from COMTRADE data

Table 8. Comparative Advantage in High-Technology Goods for Singapore

High-Technology Goods	1994			1995			1996			1997			1998		
	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS
1. Aerospace	-0.85	0.09	0.00	-0.79	0.10	0.00	-0.82	0.11	0.00	-0.84	0.09	0.00	-0.87	0.06	0.00
2. Computers-office machines	0.40	5.46	0.27	0.38	5.48	0.28	0.37	5.84	0.30	0.35	5.57	0.31	0.40	5.73	0.32
3. Electronics-telecommunications	-0.05	3.11	0.21	-0.04	3.30	0.24	-0.01	3.19	0.23	-0.01	3.09	0.23	0.02	3.09	0.24
4. Pharmacy	0.25	0.26	0.00	0.13	0.20	0.00	0.00	0.13	0.00	0.00	0.14	0.00	0.24	0.22	0.00
5. Scientific instruments	-0.26	0.68	0.01	-0.25	0.69	0.01	-0.22	0.71	0.01	-0.26	0.71	0.01	-0.14	0.76	0.01
6. Electrical machinery	-0.24	1.95	0.01	-0.18	2.15	0.01	-0.17	2.08	0.01	-0.18	1.92	0.01	-0.12	2.14	0.01
7. Chemistry	-0.47	0.20	0.00	-0.53	0.18	0.00	-0.52	0.18	0.00	-0.46	0.21	0.00	-0.27	0.22	0.00
8. Non-electrical machinery	-0.37	0.43	0.00	-0.30	0.24	0.00	-0.55	0.15	0.00	-0.54	0.18	0.00	-0.60	0.14	0.00
9. Armament	-0.11	0.01	0.00	-0.18	0.01	0.00	-0.88	0.00	0.00	0.24	0.03	0.00	-0.67	0.00	0.00

Notes:
NTR: Net Trade Ratio, $NX_{ij} = (X_{ij} - M_{ij})/(X_{ij} + M_{ij})$
WES: World Export Share, $WES_{ij} = (X_{ij}/X_i)/(X_{wj}/X_w)$
HTS: Share of Export of High Technology Products as the Percentage of Manufacturing Goods, $HTS_{ij} = (X_{ij}/X_{im})$
For categories Electrical Machinery, SITC code for 77844 is not available in all ASEAN-5 countries.
Source: Computed from COMTRADE data

Table 9. Comparative Advantage in High-Technology Goods for Philippines

High-Technology Goods	1994			1995			1996			1997			1998		
	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS
1. Aerospace	-1.00	0.00	0.00	-1.00	0.00	0.00	-0.98	0.03	0.00	-1.00	0.00	0.00	-0.88	0.01	0.00
2. Computers-office machines	-0.13	0.43	0.04	-0.15	0.49	0.05	0.18	3.05	0.16	0.25	3.50	0.19	0.21	3.23	0.17
3. Electronics-telecommunications	0.00	2.09	0.27	0.01	2.00	0.29	0.02	5.76	0.41	0.04	6.35	0.46	0.21	7.34	0.54
4. Pharmacy	-0.95	0.03	0.00	-0.93	0.04	0.00	-0.82	0.10	0.00	-0.91	0.04	0.00	-0.95	0.01	0.00
5. Scientific instruments	-0.55	0.16	0.01	-0.63	0.14	0.00	0.00	0.62	0.01	-0.10	0.47	0.01	0.02	0.39	0.01
6. Electrical machinery	-0.40	0.14	0.00	-0.73	0.07	0.00	-0.70	0.07	0.00	-0.87	0.05	0.00	-0.70	0.09	0.00
7. Chemistry	-0.81	0.10	0.00	-0.83	0.08	0.00	-0.83	0.07	0.00	-0.82	0.07	0.00	-0.81	0.06	0.00
8. Non-electrical machinery	-1.00	0.00	0.00	-0.97	0.01	0.00	-0.89	0.02	0.00	-0.99	0.00	0.00	-0.88	0.01	0.00
9. Armament	-0.22	0.16	0.00	-0.33	0.12	0.00	-0.71	0.08	0.00	-0.64	0.11	0.00	-0.46	0.08	0.00

Notes:
NTR: Net Trade Ratio, $NX_{ij} = (X_{ij} - M_{ij})/(X_{ij} + M_{ij})$
WES: World Export Share, $WES_{ij} = (X_{ij}/X_i)/(X_{wj}/X_w)$
HTS: Share of Export of High Technology Products as the Percentage of Manufacturing Goods, $HTS_{ij} = (X_{ij}/X_{im})$
For categories Electrical Machinery, SITC code for 77844 is not available in all ASEAN-5 countries.
Source: Computed from COMTRADE data

Table 10. Comparative Advantage in High-Technology Goods for Thailand

High-Technology Goods	1994			1995			1996			1997		
	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS
1. Aerospace	-0.73	0.03	0.00	-0.99	0.01	0.00	-0.97	0.01	0.00	-0.98	0.01	0.00
2. Computers-office machines	0.28	2.05	0.11	0.33	2.13	0.12	0.40	2.63	0.16	0.40	2.53	0.17
3. Electronics-telecommunications	-0.13	1.46	0.11	-0.17	1.34	0.11	-0.18	1.42	0.12	-0.12	1.43	0.13
4. Pharmacy	-0.70	0.11	0.00	-0.73	0.09	0.00	-0.73	0.09	0.00	-0.71	0.09	0.00
5. Scientific instruments	0.21	0.15	0.00	0.85	0.19	0.00	0.59	0.22	0.00	0.77	0.18	0.00
6. Electrical machinery	-0.47	0.84	0.00	-0.46	0.83	0.00	-0.37	0.95	0.00	-0.38	0.84	0.00
7. Chemistry	-0.78	0.10	0.00	-0.74	0.12	0.00	-0.71	0.15	0.00	-0.56	0.25	0.00
8. Non-electrical machinery	-0.52	0.23	0.00	-0.47	0.30	0.00	-0.45	0.28	0.00	-0.49	0.22	0.00
9. Armament	-0.93	0.02	0.00	-0.89	0.07	0.00	-0.98	0.01	0.00	-0.69	0.28	0.00

Notes: NTR: Net Trade Ratio, $NX_{ij} = (X_{ij} - M_{ij})/(X_{ij} + M_{ij})$
WES: World Export Share, $WES_{ij} = (X_{ij}/X_i)/(X_{wj}/X_w)$
HTS: Share of Export of High Technology Products as the Percentage of Manufacturing Goods, $HTS_{ij} = (X_{ij}/X_{im})$
For categories Electrical Machinery, SITC code for 77844 is not available in all ASEAN-5 countries.
Data for Thailand is not available for the year 1998.
Source: Computed from COMTRADE data

Table 11. Approved Foreign Direct Investment by Country and Region (%)

		Japan	USA	EU	NIE-3*	ASEAN-5	Others	Total
Indonesia	1986-90	14.9	5.1	13.9	17.8	3.2	45.1	100.0
	1991-96	13.5	5.0	17.4	17.6	10.8	35.6	100.0
	1986-96	13.8	5.0	16.8	17.7	9.4	37.4	100.0
Malaysia**	1986-90	25.6	4.7	7.2	33.2	11.2	18.0	100.0
	1991-96	21.0	16.4	4.9	20.8	14.1	22.8	100.0
	1986-96	22.4	12.9	5.6	32.5	13.3	21.3	100.0
Philippines	1986-90	25.4	16.5	9.3	35.6	2.5	10.8	100.0
	1991-96	14.9	21.1	13.1	16.5	12.0	22.3	100.0
	1986-96	17.5	19.9	12.2	21.2	9.7	19.4	100.0
Singapore**	1986-90	37.0	38.9	21.1	n.a	n.a	2.9	100.0
	1991-96	27.5	44.7	26.8	n.a	n.a	1.1	100.0
	1986-96	29.5	43.5	25.6	n.a	n.a	1.5	100.0
Thailand	1986-90	32.4	8.0	14.0	35.4	6.0	4.3	100.0
	1991-96	35.6	14.9	18.1	15.4	9.5	5.1	100.0
	1986-96	34.5	12.6	16.7	22.2	9.2	4.8	100.0

Notes: EU: European Union, * NIE-3: Hong Kong, South Korea, Taiwan

** Investment figures are paid-up capital plus loans. Figures for Singapore and Malaysia are investment for the manufacturing sector alone.

Source: Takeuchi, 1999a.

Table 12. Science and Technology Indicators

	Scientists and Engineers in R&D per million people 1987-97	Technicians in R&D per million people 1987-97	Science and engineering students % of total tertiary students 1987-97	Scientific and technical journal articles 1995	Expenditures for R&D % of GNP 1987-97	Royalty and license fees ($ million) Receipts (L) & Payments (R), 1998		Patent applications filed Residents (L), & Non-residents (R), 1997	
China	454	200	43	6,200	0.66	63	420	12,786	48,596
Indonesia	182	--	39	--	0.07	--	--	--	4,517
Korea. Rep.	2,193	318	32	2,964	2.82	260	2,369	92,798	37,184
Malaysia	93	32	27	--	0.24	0	0	179	6,272
Philippines	157	22	14	--	0.22	0	70	125	3,440
Singapore	2,318	301	-	891	1.13	--	--	8,188	29,467
Thailand	103	39	18	--	0.13	7	514	238	5,205

Notes: L -- left column; R -- right column
Source: The World Bank, 2000

Table 13. Southeast Asia's Foreign Direct Investment Inflows, 1993-98 (US$m)

	1993	1994	1995	1996	1997	1998
Brunei	14	6	13	11	5	4
Cambodia	54	69	151	294	204	140
Indonesia	2,004	2,109	4,346	6,194	4,673	-356
Laos	36	59	88	128	86	45
Malaysia	5,006	4,342	4,178	5,078	5,106	3,727
Myanmar	149	91	115	38	124	40
Philippines	1,238	1,591	1,478	1,517	1,222	1,713
Singapore	4,686	8,550	7,206	7,884	9,710	7,218
Thailand	1,805	1,364	2,068	2,336	3,733	6,969
Vietnam	1,002	1,500	2,000	2,500	2,950	1,900
SE Asian Total	15,994	19,681	21,643	25,980	27,813	21,400
China	27,515	33,787	35,849	40,180	44,236	45,460
Developing Countries	78,813	101,196	106,224	135,343	172,533	165,936
World	219,421	253,506	328,862	358,869	464,341	643,879
South East Asia as % of world total	7.3	7.8	6.6	7.2	6.0	3.3
South East Asia as % of developing world	20.3	19.4	20.4	19.2	16.1	12.9
South East Asia compared to China	58.1	58.3	60.4	64.7	62.9	47.1

Source: Freeman, 1999

Table 14. Comparative Advantage of Malaysian Manufacturing, 1986-1996

	1986		1996	
	WES	NTR	WES	NTR
Food	2.4	0.41	1.35	0.38
Beverages	0.14	-0.53	0.19	-0.04
Tobacco	0.01	-0.94	0.44	0.62
Textiles (excluding made-up textiles goods)	0.54	-0.28	0.57	-0.05
Made-up Textile Goods	0.02	-0.93	0.13	-0.57
Wearing Apparel	1.21	0.82	0.91	0.88
Leather & Leather products	0.07	-0.01	0.21	-0.14
Footwear	0.25	0.41	0.17	0.32
Wood & Cork Products	5.87	0.96	4.49	0.92
Furniture & Fixtures	0.20	0.17	1.51	0.82
Paper & Paper Products	0.09	-0.83	0.16	-0.61
Printing & Publishing	0.13	-0.73	0.22	-0.34
Industrial Chemicals	0.26	-0.57	0.28	-0.46
Other Chemical Products	0.33	-0.52	0.40	-0.16
Petroleum & Petroleum Products	0.67	-0.47	0.62	-0.20
Rubber Products	0.63	0.26	0.67	0.36
Plastic Products	0.41	-0.35	0.56	-0.01
Pottery & China	0.64	0.11	0.62	0.56
Glass & Glassware	0.44	-0.16	0.53	-0.21
Non-Metal Products	0.30	-0.39	0.58	-0.33
Iron & Steel	0.24	-0.64	0.26	-0.71
Non-ferrous Metals	1.22	0.33	0.50	-0.38
Fabricated Metal Products	0.17	-0.66	0.52	-0.28
Non-electrical Machinery	0.08	-0.83	0.99	-0.12
Electrical Machinery & Appliances	2.80	0.01	3.07	0.05
Transport Equipment	0.00	-0.98	0.21	-0.49
Professional, scientific & measuring equipment	0.27	-0.53	0.63	-0.21
Other industries	0.35	-0.27	0.74	0.38

Notes: NTR – net export to total trade ratio; WES – world export share
Source: Tham and Loke, 1998.

Table 15. Structure of Manufacturing

	Value Added in Manufacturing		Food, Beverages and Tobacco		Textiles and Clothing		Machinery and Transport Equipment		Chemicals		Other Manufacturing	
	($ million)		% of total		% of total		% of total		% of total		% of total	
Country	1980	1997	1980	1997	1980	1997	1980	1997	1980	1997	1980	1997
China	81,836	343,120	10	15	18	12	22	25	11	12	38	36
Indonesia	10,133	57,805	32	19	14	19	13	18	11	9	30	35
Malaysia	5,054	28,489	24	10	7	5	20	39	5	9	43	38
Philippines	8,354	18,333	30	33	13	9	12	15	14	13	31	29
Singapore	3,415	21,995	5	3	5	1	44	60	5	9	41	26
Thailand	6,960	46,502	55	55	8	5	9	8	7	8	21	24

Notes: Food, beverages, and tobacco comprise ISIC 31; Textiles and clothing comprise ISIC 32;
Machinery & transport equipment comprise ISIC 382-84; Chemicals comprise ISIC 351 & 352;
Other manufacturing includes wood related products (ISIC 32), paper and related products,
(ISIC 34), petroleum and related products (ISIC 353-56), basic metal and mineral products (ISIC 36 and 37), fabricated metal products & professional goods (ISIC 381 & 385), and other industries (ISIC 390).
Source: The World Bank, 2000

Table 16. Comparative Advantage in High-Technology Goods for China

High-Technology Goods	1994			1995			1996			1997			1998		
	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS	NTR	WES	HTS
1. Aerospace	-0.93	0.06	0.00	-0.84	0.05	0.00	-0.90	0.05	0.00	-0.96	0.02	0.00	-0.90	0.04	0.00
2. Computers-office machines	0.11	0.44	0.02	0.33	0.64	0.03	0.34	0.89	0.05	0.36	0.94	0.05	0.34	1.23	0.07
3. Electronics-telecommunications	-0.40	0.46	0.03	-0.31	0.50	0.04	-0.18	0.59	0.04	-0.13	0.58	0.04	-0.23	0.64	0.05
4. Pharmacy	0.36	0.73	0.01	0.55	0.82	0.01	0.72	0.80	0.01	0.73	0.69	0.01	0.55	0.68	0.01
5. Scientific instruments	-0.25	0.46	0.01	-0.18	0.56	0.01	-0.09	0.66	0.01	0.06	0.71	0.01	0.01	0.72	0.01
6. Electrical machinery	-0.12	0.81	0.00	-0.04	0.87	0.00	-0.14	0.84	0.00	-0.01	0.83	0.00	0.02	0.86	0.00
7. Chemistry	0.22	1.39	0.01	0.39	1.99	0.01	0.46	1.85	0.01	0.44	1.80	0.01	0.45	1.76	0.01
8. Non-electrical machinery	-0.93	0.05	0.00	-0.91	0.04	0.00	-0.94	0.04	0.00	-0.92	0.03	0.00	-0.92	0.03	0.00
9. Armament	0.96	0.16	0.00	0.91	0.10	0.00	0.84	0.08	0.00	0.62	0.09	0.00	0.94	1.10	0.00

Notes:
NTR: Net Trade Ratio, $NX_{ij} = (X_{ij} - M_{ij})/(X_{ij} + M_{ij})$
WES: World Export Share, $WES_{ij} = (X_{ij}/X_i)/(X_{wj}/X_w)$
HTS: Share of Export of High Technology Products as the Percentage of Manufacturing Goods, $HTS_{ij} = (X_{ij}/X_{im})$
Source: Computed from COMTRADE data